Claims

1. An injection nozzle (1) for internal combustion engines, which has at least one injection orifice (3), a nozzle needle seat (4), and a nozzle needle (5), characterized in that the end of the nozzle needle (5) oriented toward the nozzle needle seat (4) has an annular groove ().

2. The injection nozzle (1) according to claim 1, characterized in that the nozzle needle seat (4) is the shape of a truncated cone.

3. The injection nozzle (1) according to claim 2, characterized in that the cone angle of the nozzle needle seat (4) is approximately 60°.

4. The injection nozzle (1) according to one of claims 2 or 3, characterized in that the end of the nozzle needle (5) oriented toward the nozzle needle seat (4) is a cone and that the cone angle of the nozzle needle (5) is up to one degree greater than, preferably 15 to 30 angular minutes greater than, the cone angle of the nozzle needle seat (4).

5. The injection nozzle (1) according to one of claims 2 to 4, characterized in that the annular groove (8) runs parallel to the base surface of the cone.

6. The injection nozzle (1) according to one of the preceding claims, characterized in that a blind hole (2) adjoins the nozzle needle seat (4) and has at least one injection orifice (3).

7. The injection nozzle (1) according to claim 6, characterized in that when the injection nozzle (1) is closed, the distance of the transition (7) between the blind hole (2) and the nozzle seat (4) from the bottom (9) of the injection nozzle (1) and the distance of the annular groove (8) from the bottom (9) of the injection nozzle (1) are essentially equal.

8. The injection nozzle (1) according to claim 6 or 7, characterized in that the width of the annular groove (8) is approximately 0.1 mm to 0.3 mm, preferably approximately 0.16 mm to 0.24 mm.

9. The injection nozzle (1) according to one of claims 6 to 8, characterized in that the depth of the annular groove (8) is approximately 0.02 mm to 0.2 mm, preferably approximately 0.08 mm to 0.14 mm.

10. The injection nozzle (1) according to one of claims 6 to 9, characterized in that the blind hole (2) is conical.

11. The injection nozzle (1) according to one of claims 6 to 9, characterized in that the blind hole (2) is cylindrical.

12. The injection nozzle (1) according to one of claims 6 to 11, characterized in that the blind hole (2) is a mini-blind hole or micro-blind hole.

13. The injection nozzle (1) according to one of claims 1 to 5, characterized in that the nozzle needle seat (4) has at least one injection orifice (3).

14. The injection nozzle (1) according to claim 13, characterized in that when the injection nozzle (1) is closed, the distance of the piercing point (16) of the longitudinal axis of the injection orifice(s) (3) through the nozzle needle seat (4) from the bottom (9) of the injection nozzle (1) and the distance of the annular groove (8) from the bottom (9) of the injection nozzle (1) are essentially equal.

15. The injection nozzle (1) according to claim 13 or 14, characterized in that the width of the annular groove (8) is greater than, preferably one-and-a-half times greater than, the diameter of the injection orifice(s) (3).

16. The injection nozzle (1) according to one of claims 13 to 15, characterized in that the depth of the annular groove (8) is less than the width of the annular groove (8).

17. The injection nozzle (1) according to one of claims 13 to 16, characterized in that the depth of the annular groove (8) is approximately 0.02 mm to 0.1 mm, preferably approximately 0.04 mm to 0.07 mm.